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Frogs of the Genus *Platymantis* (Ranidae) in New Guinea, with the Description of a New Species

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INTRODUCTION

The late E. Thomas Gilliard, Curator in the Department of Ornithology of the American Museum of Natural History, generously spared some of his time, on his last trip to New Guinea, to collect amphibians and reptiles for the museum. He and Soekarja Somadikarta of the Museum Zoologicum Bogoriense, Bogor, Indonesia, made a small collection of frogs on Batanta Island, remarkable in that it includes three species of *Platymantis*. Although several species of *Platymantis* (for the use of the name *Platymantis* rather than *Cornufer*, see Zweifel, 1967) are recorded from New Guinea, there were no reported instances of sympatry prior to the collection made by Somadikarta and Gilliard. One of the species collected on Batanta is undescribed, and the description of it necessitates a brief review of the other species attributed to the Papuan fauna.

Measurements of specimens were made with vernier calipers or with an ocular micrometer in a binocular dissecting microscope: length from snout to vent, S-V; length of tibia, from heel to fold of skin at knee, TL; head width, taken at widest part, HW; eye length, from corner to corner of orbital opening, Eye; internarial distance, In; distance from eye to naris, E-N; horizontal diameter of tympanum, including annular

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ring, Ear. Measurements involving the nares were taken from the center of the naris.

ACKNOWLEDGMENTS

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ABBREVIATIONS

A.M.N.H., the American Museum of Natural History
B.M.N.H., British Museum (Natural History)
F.M.N.H., Field Museum of Natural History, Chicago
M.C.Z., Museum of Comparative Zoology, Harvard University
M.S.N.G., Museo Civico di Storia Naturale di Genova
M.Z.B., Museum Zoologicum Bogoriense, Bogor, Indonesia
Z.M.A., Zoological Museum of Amsterdam

Platymantis batantae, new species

Platymantis corrugata: PETERS AND DORIA, 1878, p. 100 (part; specimens from Moluccas and Batanta Island).

HOLOTYPE: A.M.N.H. No. 74192, obtained by S. Somadikarta and E. T. Gilliard on Mt. Besar above Wailebet, elevation 1500 feet, Batanta Island, West Irian, on June 19, 1964.



FIG. 1. Dorsal view of holotype of *Platymantis batantae*, A.M.N.H. No. 74192. $\times 1.5$.

PARATYPES: A.M.N.H. No. 74193 and one specimen in the Museum Zoologicum Bogoriense, collected on June 20, 1964, but otherwise with the same data as the holotype; two specimens, both catalogued as M.S.N.G. No. 29867, one from Batanta Island and the other from "Moluccas," both collected by Odoardo Beccari in 1875 (another specimen bearing the same number is *P. papuensis* taken by Beccari on Batanta).

DIAGNOSIS: A species of *Platymantis* of moderately small size (maximum known length from snout to vent, 40 mm.), with narrow digital discs, first finger longer than second, fourth finger shorter than other three, internarial distance equal to or greater than distance from eye to naris, and with only a trace of webbing on hind toes.

Platymantis batantae differs from the other three Papuan species as follows: from *P. papuensis* in being smaller and in that the internarial distance of *papuensis* is less than the distance from eye to naris ($E-N/In > 1.10$); from *P. punctata* in the same two ways and in that the toes of *punctata* have more than slight basal webbing; from *P. cheesmanae* in its attainment of larger size (maximum length S-V in *cheesmanae*, 27 mm.) and in having the first finger longer than the second (conspicuously shorter than the second in *cheesmanae*).

DESCRIPTION OF TYPE SPECIMEN (FIG. 1): The type is an adult female with the following measurements (in millimeters): S-V, 40.0; TL, 23.1; HW, 16.7; Eye, 6.0; E-N, 4.1; In, 4.2; Ear, 2.9.

The snout is bluntly pointed, the canthus is distinct but rounded, and the loreal region is oblique and slightly concave. The internarial distance is slightly greater than the distance from the eye to the naris, and the nares are much closer to the tip of the snout than to the eye. The tympanum is distinct and about one-half of the diameter of the eye. The anterior edge of the tympanum is about one-half of its diameter from the posterior corner of the orbit. The interorbital distance is less than the width of an upper eyelid.

The upper jaw is toothed. The vomerine teeth are in two short rows, five or six teeth to a row, situated between and behind the internal nares.

The relative lengths of the fingers are $3 > 1 > 2 > 4$. The subarticular tubercles are strong, and there are large inner, middle, and outer metacarpal tubercles. The tips of the fingers are only slightly broadened, but the grooves separating dorsal and ventral parts are well developed. There is no web. The relative lengths of the toes are $4 > 3 > 5 > 2 > 1$. There are strong, pointed, subarticular tubercles. The inner metatarsal tubercle is well developed, but the outer tubercle is somewhat weaker. There are numerous small tubercles on the sole. The tips of the toes are broadened into narrow discs with grooves well developed. The small area of webbing restricted to the basal portion of the toes is evident only when the toes are spread.

The dorsal surfaces of the head, body, and limbs are finely tuberculate. A strong fold passes from the posterior corner of the eye above the tympanum and descends behind it. The back bears several narrow, elongate, dermal folds. The chin, chest, and anterior abdominal areas are smooth, but the posterior part of the abdomen and the under sides of the hind limbs are slightly granular.

The ground color of the dorsal surfaces is light brown. There are indistinct darker bars and spots on the upper lip, and the tympanic and

some dorsal skin folds are dark brown. Other small, scattered, dark brown markings are present on the head, body, and anterior limbs. The hind limbs have indistinct dark cross bars. The palms are pale, whereas the soles and posterior tarsal areas are dark. The posterior sides of the thighs are dark. The ventral surfaces are wholly pale and unmarked.

The holotype contains large, unpigmented ova approximately 3.5 mm. in diameter.

VARIATION: Two of the paratypes from Batanta Island (one in the American Museum of Natural History, the other in the Museum Zoologicum Bogoriense) are males. The third paratype, in the Museo di Storia Naturale Genova, is a juvenile the sex of which I did not determine. The specimen from the "Moluccas" is a gravid female, with a snout-to-vent length of 39.4 mm.; the males measure 26.5 mm. and 31.0 from snout to vent. The five specimens have the following average proportions (mean \pm standard error, range): TL/S-V, 0.534 ± 0.014 (0.49–0.58); E-N/In, 0.96 ± 0.02 (0.90–1.00); HW/S-V, 0.421 ± 0.002 (0.42–0.43). The tympanum is relatively larger in the male specimens, 25 per cent and 29 per cent of the head width, compared with 15 per cent and 17 per cent in the females.

I can find no vocal sac openings in the male paratypes. Perhaps they are immature, although the size of the testes and the size of the tympanum of the larger of the two specimens are indicative of sexual maturity.

The larger male paratype has a dark brown ground color with little pattern showing. The supratympanic marking, dark color of the posterior surfaces of the thighs, and immaculate under sides agree with those of the holotype. The smaller male paratype also has the tympanic marking, and the same color on the thighs and ventral surfaces. The ground color is pale brown, with a large, dark figure occupying much of the head and back, and the markings on the lips and hind limbs are more prominent than on the other specimens. The posterior surfaces of the thighs are unpatterned also in the female and juvenile paratypes, but in the female, which may be faded, are not darker than the general ground color of the body.

COMPARISON WITH OTHER SPECIES: *Platymantis batantae* is sufficiently distinct from other Papuan species to make unnecessary comparisons additional to those in the diagnosis. The new species is, in fact, much more similar to forms found more than 1200 miles to the east, in New Britain.

Platymantis gilliardi and *P. mimicus* of New Britain (see Zweifel, 1960; and Brown and Tyler, 1968) resemble *P. batantae* in several important re-

spects: maximum size (44 to 45 mm.); first finger longer than adpressed second; finger tips scarcely broadened and narrower than toe discs. The dorsum of *gilliardi* is "relatively smooth except for [an] urnshaped, axillary pair of folds," whereas *mimicus* has "numerous folds of short to moderate length" (Brown and Tyler, 1968, p. 71). *Platymantis batantae* resembles *P. mimicus* with respect to dorsal skin folds. The diameter of the eye is "usually greater than 35 per cent of head breadth" in *mimicus* and "usually less than 35 per cent" in *gilliardi* (Brown and Tyler, *loc. cit.*), whereas the average for five individuals of *batantae* is 0.348 per cent, range 0.31 to 0.37 per cent. The length of the first finger is "usually less than 85 per cent of third finger length" in *mimicus* and "usually more than 85 per cent" in *gilliardi* (Brown and Tyler, *loc. cit.*). For two specimens of *batantae*, the figures are 81 per cent (holotype) and 66 per cent (larger male paratype), so the resemblance is closer to *mimicus* in this respect. Brown and Tyler gave no information on the relative spacing of the nares in *P. mimicus*, but the ratio of eye-naris distance to internarial span is almost identical in *batantae* and *gilliardi*.

The similarity of *Platymantis batantae* to *P. gilliardi* and *P. mimicus* has a curious parallel in the species pair *P. punctatus* (including *P. beauforti*) and *P. myersi*, widely disjunct between the western tip of New Guinea and Bougainville Island in the Solomon Islands (Zweifel, 1960, p. 18). One wonders whether the resemblances result from similar adaptive responses to insular environments, or whether they reflect the relictual occurrence of related forms once more widely distributed in the intervening region. I am inclined to favor the latter interpretation.

DISTRIBUTION AND SPECIMENS EXAMINED: The only specimens with definite data come from Batanta Island (fig. 5). The island is about 22 miles west of the western tip of New Guinea and is separated from Salawati Island to the south by a strait 4 miles wide. Greenway (1966, p. 3) noted that "Batanta is 33 miles long and varies from 8 to 10 miles in width, but Mt. Besar, near the center of the island, is 3510 feet in height," and he presented some of Gilliard's field notes on habitat conditions.

Whether *Platymantis batantae* occurs on islands other than Batanta is unknown. There is no assurance that the specimen captured by Beccari on the "Moluccas" did not come from Batanta. The only specimens I have examined are the holotype and paratypes.

Somadikarta and Gilliard collected both *Platymantis papuensis* and *P. punctata* in addition to *P. batantae* on Batanta Island. The specimens of *papuensis* came from Wailebet, near sea level, so were not in the strict sense sympatric with the specimens of *batantae* taken at an elevation of

1500 feet. Both *batantae* and *punctata* were found at the same locality.

Platymantis papuensis papuensis Meyer

Platymantis corrugatus papuensis MEYER, 1874, p. 139. Type locality, "Mysore" (= Biak Island), West Irian; type specimen? LOVERIDGE, 1948, p. 407.

Platymantis corrugata: PETERS AND DORIA, 1878, p. 100 (part). BOULENGER, 1918, p. 373 (part).

Cornufer corrugatus: BOULENGER, 1882, p. 110 (part).

Cornufer corrugatus rubristriatus BARBOUR, 1908, p. 190. Type locality, "Roon Island, Geelvink Bay," West Irian; syntypes (2), M.C.Z. No. 2441.

Cornufer moszkowskii VOGT, 1912, p. 358. Type locality, "interior of Dutch New Guinea . . . between 137°50' to 138°50' east longitude and 1°45'-3°50' south latitude"; type specimen? BROWN, 1965, p. 3.

Rana rugata VAN KAMPEN, 1923, p. 190 (part). Substitute name for *corrugata*, preoccupied in *Rana*.

Rana rugata rubristriata: VAN KAMPEN, 1923, p. 191. Substitute name for *corrugata*, preoccupied in *Rana*.

Rana moszkowskii: VAN KAMPEN, 1923, p. 188.

Platymantis corrugatus rubrostriatus: LOVERIDGE, 1948, p. 409.

Platymantis papuensis papuensis: BROWN, 1952, p. 51.

C.[ornufer] papuensis: INGER, 1954, p. 355.

C.[ornufer] rubristriatus: INGER, 1954, p. 355. BROWN, 1965, p. 3.

Cornufer p.[apuensis] papuensis: BROWN, 1965, p. 2.

TAXONOMIC NOTES: The common *Platymantis* of New Guinea has had a moderately complicated taxonomic history, as indicated above. The species has been shuffled among three genera both because of differing opinions as to how finely ranid genera should be split (e.g., Inger, 1954; Gorham, 1965; Brown, 1965), and for purely taxonomic reasons (Zweifel, 1967).

Two forms have been described from New Guinea that I regard as synonyms of *Platymantis papuensis*. Barbour (1908) described *Cornufer corrugatus rubristriatus*, based on two specimens from Roon Island, Geelvink Bay. Van Kampen (1923, p. 191, as *Rana rugata* var. *rubristriata*) and Loveridge (1948, p. 409, as *Platymantis corrugatus rubrostriatus* [sic]) agreed to subspecific status for the form, but Brown (1965, p. 3) listed it as a full species, *Cornufer rubristriatus*. Van Kampen (*loc. cit.*) commented "Perhaps identical with *P. solomonis*," but he had seen specimens of neither *rubristriatus* nor *solomonis*. Loveridge (*loc. cit.*) noted that "None of the four structural characters mentioned by Barbour separate *rubrostriatus* from the mainland [New Guinea] specimens . . .," but evidently he thought that the reddish middorsal stripe provided enough difference to justify subspecific status for the population. *Platymantis papuensis* is polymorphic with respect to color pattern, and displays at least three morphs: unicolor, two-striped (dorsolateral), and one-striped (vertebral).

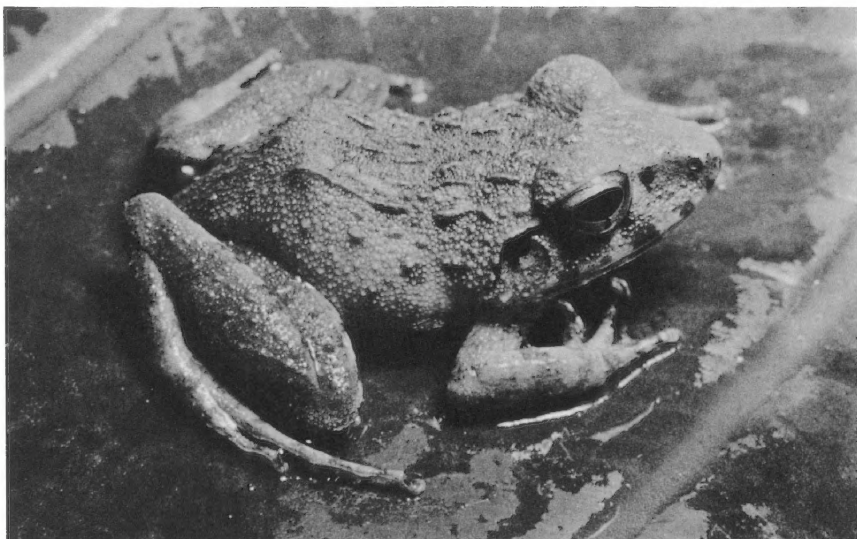


FIG. 2. *Platymantis papuensis*, A.M.N.H. No. 74829, from Lae, Territory of New Guinea. $\times 2$.

For illustrations of the first, see figure 2; of the first two, see Zweifel (1960, figs. 8 and 9); and for the third, Barbour's (1912, pl. 5) illustration of a syntype. The morph with a single stripe is the least common of the three in mainland populations with which I am familiar, and Loveridge (*loc. cit.*) did not observe it in 62 specimens. Perhaps this pattern phase is unusually common on Roon Island, but this in itself scarcely justifies subspecific recognition.

The second probable synonym of *Platymantis papuensis* is *Cornufer moszkowskii* Vogt, 1912. Brown (1965, p. 2) listed it under the original combination but noted that he had not seen specimens. Van Kampen (1923, p. 188) also treated it as a species, but commented, "Probably identical with *R. rugata* [= *P. papuensis*] or *boulengeri*." I agree with Loveridge (1948, pp. 407-408), who thought that *moszkowskii* was based on a color variant (the two-striped morph) of *papuensis*. I find nothing in the original description that clearly differentiates *moszkowskii* from *papuensis*. Unfortunately, the provenance of the type specimen is unknown, other than that it came from somewhere in a vast area centered on the Mamberamo and Idenburg rivers in West Irian.

DIAGNOSIS: The following combination of characters distinguishes *P. papuensis* from the other three Papuan species: toes with no more than a slight basal trace of a web; internarial distance less than distance from

eye to naris ($E-N/In > 1.10$); first finger longer than second when two are adpressed; maximum snout-to-vent length of males, about 46 mm., of females, about 64 mm.; back with numerous short skin folds.

Platymantis punctata is a larger frog (males to at least 51 mm. from snout to vent; females to 78 mm.), with the toes about one-half webbed. *Platymantis cheesmanae* is much smaller (largest adult female, 27 mm. from snout to vent), has the first finger shorter than the second, and the internarial distance broader than the distance from eye to naris ($E-N/In < 1.00$). *Platymantis batantae* is smaller (maximum known length, 40 mm. from snout to vent), with the internarial distance equal to or greater than the distance from eye to naris.

VOCALIZATION: It is likely that when adequate information is available, knowledge of the calls of the species of *Platymantis* will be important in defining species, especially in cases in which insular populations scattered over thousands of miles of ocean are referred to one species. I have gathered data on only one species, *P. papuensis*, and present these data to make them available for possible future comparisons.

Platymantis papuensis calls at night (sometimes beginning well before sunset) from the floor of the rain forest, usually from an exposed or slightly sheltered position on the leaf litter but rarely a few inches up in a shrub. The usual call of the male is a series of short, quacking notes given in groups of about three to 19, with a pause of about one to eight seconds between call-groups (fig. 3, table 1). One long-winded individual called 23 times and after a pause of one second called 48 times. Individual notes last about 0.1 second and are separated by intervals of about 0.1 to 0.2 seconds at the usual calling temperatures (ca. 22°–24° C. in my experience). Each note includes a relatively harsh initial segment with numerous closely spaced harmonics and a terminal segment with a fundamental at about 1000 to 1500 cycles per second. Commonly the second harmonic of the second segment is emphasized. The vocal sac expands with each note and then relaxes slightly; perhaps the change in harmonic structure is related to the change in this resonator. Some calls show a conspicuous rise and fall of frequency in the well-tuned segment, whereas others exhibit only a rise.

I have avoided labeling the call described above as a "mating call." It may well serve to attract female frogs, but this has not been established. The call is, however, implicated in territorial activity. When a tape-recording of the call is played back to a calling frog, the frog immediately (often before playback of a single call-group is completed) responds with a mixture of squeaking and quacking noises that lacks the monotonous regularity of the usual call. If no further stimulation

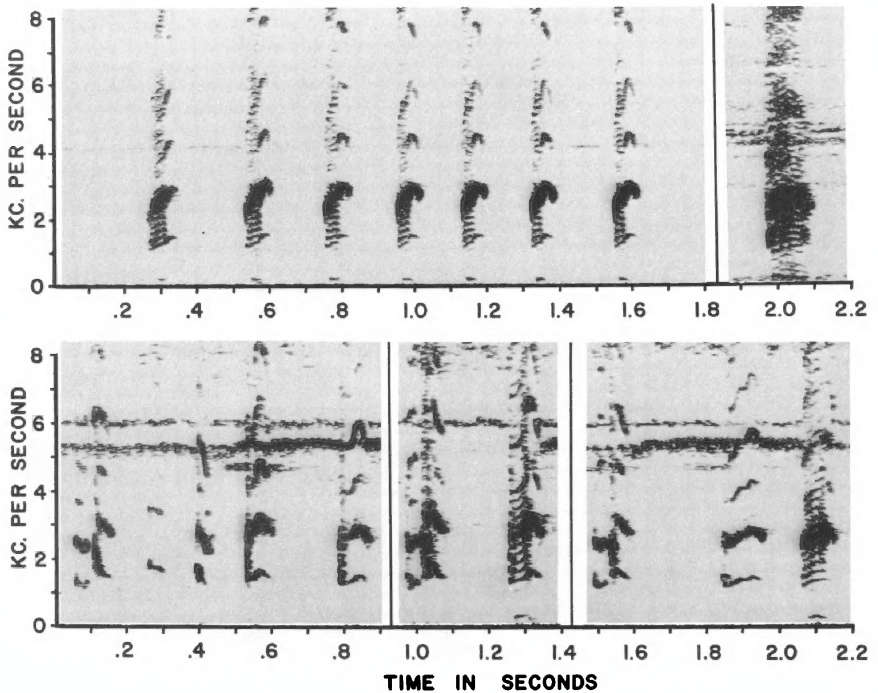


FIG. 3. Audiospectrograms (narrow band, 45 cycles per second) of calls of *Platymantis p. papuensis*. *Upper left*: A typical call-group. *Upper right*: A response call uttered by the same individual. *Lower*: Three groups of response calls given by another individual. The continuous background traces are insect sounds.

by means of playback is offered, a gradual change to the usual call takes place through a mixture of "normal" and "response" calls. In one instance a frog responded in typical fashion to playback of a single call-group. After about a minute it began to add shortened groups of "normal" calls to the "response" calls, but it called for three minutes before resuming the pattern of calling it had shown before. On two occasions I saw a calling frog move toward the loudspeaker, which I interpret as territorial response.

I can indicate only approximately the distance from which a frog will reply with the "response" call. Playback from a distance of 10 feet or less elicited the response call in eight out of eight instances. One frog failed to respond from 20 feet but did so from 15 feet; another responded from 30 feet. Undoubtedly, variation in intensity of playback (I attempted to adjust the playback volume to approximate the loud-

TABLE 1
CHARACTERISTICS OF THE CALL OF *Platymantis papuensis*

Frog Number	Notes per Call Group			Interval in Seconds between Call Groups			Air Temp., °C.
	Mean	Range	N	Mean	Range	N	
1	12.8	(4-19)	14	2.8	(1.9-5.8)	10	—
2	9.6	(3-15)	13	3.2	(2.0-5.5)	11	24.0
3	8.2	(5-12)	10	4.9	(3.2-7.7)	10	23.6
4	6.7	(5-13)	26	2.5	(1.2-5.3)	24	—
5	16.7	(5-48)	10	2.1	(1.0-3.0)	9	22.2
Mean	10.8			3.1			

ness of a calling frog) and in the acoustic environment influenced the responses.

I can detect no difference between calls of *P. papuensis* recorded almost 500 miles apart, at Kokoda, Territory of Papua, and those at Maprik, Territory of New Guinea. It would be of interest to compare calls of the insular subspecies *P. p. schmidtii* of New Britain and *P. p. weberi* of the Solomon Islands with the call of the New Guinea form.

DISTRIBUTION: *Platymantis papuensis* ranges from Sulabesi in the Moluccas on the west (Soela, Sula; Mertens, 1930, p. 144) to Malaita and Guadalcanal islands in the Solomon Islands in the east (Brown, 1952, p. 50). The populations of New Britain and the Solomon Islands are assigned, respectively, to *P. papuensis schmidtii* and *P. p. weberi* (Brown and Tyler, 1968), and the remainder of the range (including New Guinea) to *P. p. papuensis*.

Platymantis papuensis is common in lowland rain forest throughout much of New Guinea, but appears to be absent from most of the south coast (fig. 5). It is reported from localities on Milne Bay at the eastern end of New Guinea (Boulenger, 1898, p. 706; Loveridge, 1948, p. 407), but there are no records for the southern drainage of the Territory of Papua. The easternmost record in the southern part of West Irian is the Setakwa River (Boulenger, 1914, p. 250). Many large collections of frogs have been made in southern New Guinea, so lack of collecting cannot wholly be responsible for the apparent gap in distribution. Also, *papuensis* is, by virtue of its incessant vocalization, a conspicuous frog and one most likely to be collected if present.

The range of the species includes the D'Entrecasteaux Islands, Trobriand Islands, and Misima Island off the eastern end of New Guinea, but apparently not Woodlark Island or the Louisiade Islands, where members of the Sixth Archbold Expedition collected a variety of frogs

but no individual of *Platymantis*.

The distribution of *P. papuensis* on New Guinea appears to be limited to relatively low elevations, probably below 3000 feet. The highest elevation at which I have collected it is 2400 feet at Garaina, Territory of New Guinea. I did not find it at Wau (3500 feet) or Baiyer River (3800 feet), and there are no records in the literature for higher elevations. The distribution map (fig. 5) includes plots both for specimens I have examined and for literature records on New Guinea and islands to the west. Only specimens examined and records of Brown and Tyler (1968, p. 85) are plotted for New Britain.

Platymantis punctata Peters and Doria

Platymantis punctata PETERS AND DORIA, 1878, p. 100. Type locality, Hatam, Arfak Mountains, West Irian; holotype, M.S.N.G. No. 29738, collected by Luigi M. D'Albertis in 1872. BOULENGER, 1918, p. 373.

Cornufer punctatus: BOULENGER, 1882, p. 110.

Cornufer beauforti VAN KAMPEN, 1913, p. 91. Type localities, Bajon and Majalibit Bay, Waigeu Island, West Irian; 11 syntypes collected by L. F. de Beaufort in 1910 (see Daan and Hillenius, 1966, p. 120). BROWN, 1965, p. 2.

P.[latymantis] beauforti: BOULENGER, 1918, p. 373. GORHAM, 1965, p. 410.

Rana beauforti: VAN KAMPEN, 1923, p. 189.

Cornufer punctata: BROWN, 1965, p. 3.

Platymantis punctatus: GORHAM, 1965, p. 412.

TAXONOMIC NOTES: *Platymantis punctata* and *Cornufer beauforti* have been treated as valid species by all concerned since they were first described, although their generic assignments have varied. No specimens of either species have been reported since the types were collected, so the collection on Batanta Island by Gilliard and Somidakarta of five frogs identifiable as *beauforti* prompted me to review the status of the two species.

Peters and Doria (1878, p. 100) based their description of *Platymantis punctata* on a single specimen, comparing it with "*Platymantis corrugata*" from several localities: "Moluccas"; Batanta Island; Jobi Island (= Japen Island); Faer Island; and Manisman, Andai, and Mt. Arfak on the mainland of New Guinea. Some specimens from the "Moluccas" and Batanta Island are *P. batantae*. Most of the others are *P. papuensis*, but only one of the three from Mt. Arfak is *papuensis*; the other two are referable to *punctata*.

The original description characterized *punctata* as follows: "This species is distinguished not only by its color, but also by the proportions and length of the fingers in which the first, instead of being much longer than the second is equal to it. The feet are provided with distinct swimming membranes, whereas the preceding species [*Platymantis corrugata*] does

not possess these.

"... The side of the head, the body, the sternal area and also the submental region show spots of a beautiful orange color. The posterior parts of the femora are vermiculated with the same color" (Peters and Doria, 1878, pp. 100-101).

It is curious that, in emphasizing the diagnostic importance of the webbing in *punctata*, Peters and Doria should have overlooked this character in two of the specimens from Mt. Arfak (one specimen bears a tag on which "Hatam" is dimly visible; the other has no more specific data). In one specimen the outer toe is about one-third webbed and in the other, about one-half; the holotype of *punctata* has the toe almost one-half webbed. The dorsal skin is smooth except for the supratympanic fold in all three specimens, in contrast to the dorsum of *papuensis* which bears numerous short longitudinal folds. The first finger is longer than the second in the two frogs from Mt. Arfak, but only slightly so. I find that the length of the first finger of the holotype of *punctata* equals that of the second on one side and appears slightly longer on the other.

The finely mottled pattern of the groin and anterior and posterior surfaces of the thighs is essentially the same in all three specimens. In possessing light spots on the side of the head and body rather than a barred (head) or mottled (body) pattern, the holotype of *punctata* differs from the other two specimens. It is, however, easy to see how the pattern of *punctata* could be derived by a slight increase in melanic pigmentation, reducing the light mottling to discrete spots. In short, I can see no adequate basis for assigning these three specimens to more than one species.

Van Kampen (1913, pp. 91-92), in his original description of *Cornufer beauforti*, compared his new species only with *meyeri* of the Philippine Islands, not mentioning the Papuan species. In his later summary (1923, p. 162), he characterized *beauforti* as having the tongue "with a conical papilla," whereas the related species were "without papilla." Loveridge (1948, p. 410) regarded the use of the lingual papilla to separate species as "of rather dubious value."

I have examined five of the syntypes of *Cornufer beauforti*, and find the specimens from Batanta Island closely similar to them in all pertinent details of finger length, smoothness of dorsal skin, toe webbing, and color pattern. Van Kampen considered the toes of *beauforti* to have basal webbing, but his illustration of the "type specimen" (1923, fig. 24) shows the outer toe almost one-half webbed. In contrast, *P. papuensis* has only a faint trace of webbing visible with the toes spread.

I compared a specimen from Batanta Island directly with the holotype of *punctata* and with the other two specimens from Mt. Arfak that I



FIG. 4. Dorsal view of *Platymantis beauforti*, A.M.N.H. No. 74185, from Batanta Island. $\times 1$.

identify as *punctata*. The specimen from Batanta differs in no important way from the two referred specimens, and differs from the holotype only in the same minor ways as the other two. I can see no firm basis for continuing to recognize *beauforti* as a distinct species; specimens from Waigeu Island, Batanta Island, and Mt. Arfak may all be referred to *Platymantis punctata*.

DIAGNOSIS: *Platymantis punctata* is of moderately large size (maximum known length, 78 mm. from snout to vent), with relatively smooth dorsal skin, outer toe one-third to one-half webbed, first finger equal in length or (more commonly) slightly longer than second, and internarial distance less than distance from eye to naris ($E-N/In > 1.00$).

Platymantis papuensis is a smaller species, with numerous short skin folds on the dorsum and with only a slight trace of toe webbing. *Platymantis batantae* is even smaller (40 mm. from snout to vent), with scant toe web-

bing and internarial distance equal to or greater than the distance from eye to naris ($E-N/In < 1.00$). *Platymantis cheesmanae* is a diminutive species (27 mm. from snout to vent), with the first finger shorter than the second and the internarial distance greater than the distance from eye to naris ($E-N/In < 1.00$).

DESCRIPTION OF TYPE SPECIMEN: The holotype specimen of *Platymantis punctata* (M.S.N.G. No. 29738) has the following measurements (in millimeters): S-V, 53.0; TL, 28.1; HW, 21.0; Eye, 7.3; E-N, 5.8; In, 5.2; Ear, 4.2; disc of third finger, 1.3; width of penultimate phalanx of third finger, 0.8.

The first finger is equal to (one hand) or slightly longer than the second. The fingers bear slightly enlarged and grooved discs. The discs of the toes probably were slightly larger than those of the fingers, but in the present state of preservation cannot be determined for certain. There are moderate to large subarticular tubercles on both hands and feet. The metacarpal tubercle at the base of the thumb is most prominent; there is a large inner metatarsal tubercle, but no outer. The soles are virtually smooth, without prominent tubercles. The relative lengths of the toes are $4 > 3 > 5 > 2 > 1$; the outer toe is almost one-half webbed.

The dorsal color is faded, mottled brown. The sides of the head are darker brown with several light spots, and the sides of the body similarly darker than the dorsal region with light spots. Light spots are also present on the lower lip and forelimbs. The anterior and posterior surfaces of the thighs are mottled, and the under side of the tibia is strongly mottled.

VARIATION: The 13 specimens examined have the following proportions (mean \pm standard error, range): TL/S-V, 0.514 ± 0.009 (0.45–0.55); E-N/In, 1.17 ± 0.02 (1.08–1.29); HW/S-V, 0.393 ± 0.005 (0.37–0.43). The largest specimen is a female 78.5 mm. S-V (Z.M.A. No. 5156); the largest male measures 51.4 mm. (A.M.N.H. No. 74188).

The dorsal surfaces are typically (in preservative) dark brown, almost patternless. The facial area is darker brown, with broad, vertical bars on the upper lips that continue less intensely onto the lower lip. The sides of the body are lightly mottled; the groin is more heavily so. The posterior surfaces of the thighs bear much finer mottling, and the under sides of the tibiae are heavily mottled. The ventral surfaces (tibiae excepted) are pale and virtually patternless, except for faint grayish mottling on the chin. As is mentioned above, the holotype differs in that light areas of the head and body (such as the spaces between the dark facial bars) are restricted to spots.

DISTRIBUTION AND SPECIMENS EXAMINED: Present information indicates

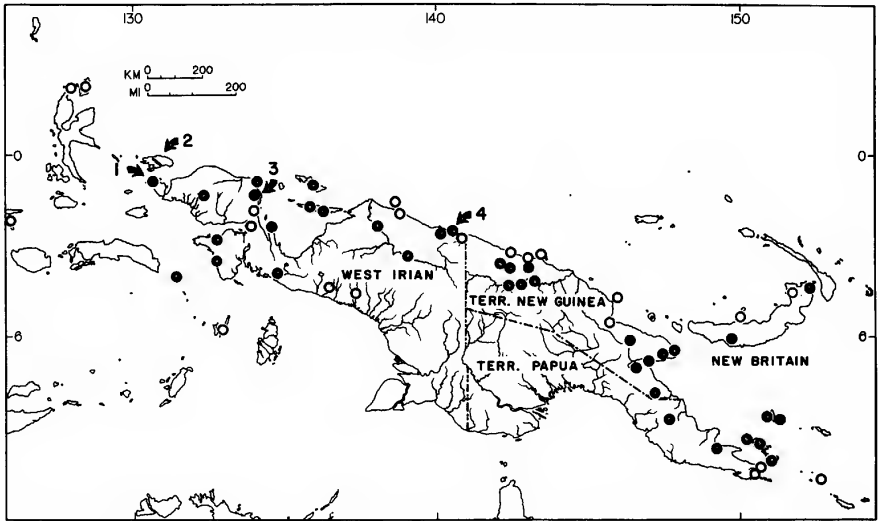


FIG. 5. Distribution of *Platymantis* in New Guinea. Spots (for specimens examined) and circles (literature records) show distribution of *P. p. papuensis* on New Guinea and other islands, and of *P. p. schmidtii* on New Britain; the eastern part of the range in the Solomon Islands is not shown. Other species are recorded as follows: 1, *P. batantae*, Batanta Island; 1, 2, *P. punctata*, Batanta Island and Waigeu Island; 3, *P. punctata*, Arfak Mountains; 4, *P. cheesmanae*, Cyclops Mountains.

that *Platymantis punctata* is endemic to the Vogelkop Peninsula of New Guinea and adjacent islands (fig. 5). I have examined the following specimens: Hatam, Mt. Arfak (M.S.N.G. No. 29738, holotype of *P. punctata*; M.S.N.G. No. 29371, one of three specimens with this number); Mt. Arfak (M.S.N.G. No. 29371, one of three specimens with this number); Batanta Island, Mt. Besar above Wailebet, 1500–1600 feet (A.M.N.H. Nos. 74185–74188); M.Z.B., one uncatalogued specimen); Waigeu Island, Bajon (Z.M.A. Nos. 5756, 5757, syntypes of *C. beauforti*); Waigeu Island, Majalibit Bay (Z.M.A. Nos. 5156, 5755; M.C.Z. No. 10774; syntypes of *C. beauforti*).

Platymantis cheesmanae Parker

Platymantis cheesmanae PARKER, 1940, p. 257. Type locality, "Cyclops Range, Dutch New Guinea, at 3000–4000 feet"; holotype, B.M.N.H. No. 1947.2.4.43 (formerly 1938.6.5.28). GORHAM, 1965, p. 411.

Cornufer cheesmanae: BROWN, 1965, p. 2.

DIAGNOSIS: This is the smallest Papuan species of *Platymantis*, and reaches a maximum length from snout to vent of only 27 mm. The inter-

narial distance is greater than the distance from eye to naris. *Platymantis cheesmanae* is the only species of its genus in New Guinea in which the second finger is longer than the first.

DESCRIPTION: The proportions of 10 specimens of the type series (including the holotype) are: TL/S-V, 0.455 ± 0.007 (0.42–0.50); HW/S-V, 0.417 ± 0.006 (0.40–0.46); E-N/In, 0.83 ± 0.02 (0.75–0.88); Eye/S-V, 0.140 ± 0.001 (0.13–0.15). The largest specimen in a series that includes gravid females is a female 27 mm. from snout to vent; the largest male measures 23 mm. (Parker, 1940, p. 259). I have nothing other than the above summary of proportions to add to Parker's (1940, pp. 257–259) detailed description.

DISTRIBUTION AND SPECIMENS EXAMINED: *Platymantis cheesmanae* is recorded only from the Cyclops Mountains, an isolated coastal range with a maximum elevation of about 7000 feet situated west of Sukarnapura (Hollandia), West Irian (fig. 5). The elevation of "3000–4000 feet" recorded for the type series suggests that this form may be restricted to elevations higher than those frequented by *P. papuensis* for which I have found no records in New Guinea as high as 3000 feet. *West Irian:* Cyclops Range, 3000–4000 feet in elevation (B.M.N.H. Nos. 1947.2.4.43 (holotype), 1947.2.7.8, 1947.2.7.10–1947.2.7.12, 1947.2.7.14–1947.2.7.16 (paratypes); A.M.N.H. Nos. 75101, 75102 (formerly B.M.N.H. Nos. 1947.2.7.16 and 1947.2.7.9; paratypes); Doromena (F.M.N.H. No. 43319).

KEY TO THE FROGS OF THE GENUS *PLATYMANTIS* IN NEW GUINEA

Frogs of the genus *Platymantis* are readily distinguished from other frogs of New Guinea. All Papuan *Rana* have extensive webbing of the hind toes, whereas the toes of *Platymantis* are at the most half-webbed. Microhylid frogs that might be confused with *Platymantis*, particularly with the small *P. cheesmanae*, all lack teeth, but both maxillary and vomerine teeth are present in *Platymantis*. *Lechriodus* and *Platymantis* are superficially similar, the teeth can be used to distinguish between these genera also. In the leptodactylid *Lechriodus* the vomerine teeth extend behind the nares in two strong, transverse rows that almost meet on the midline, whereas in *Platymantis* these teeth are in small, widely separated groups between and behind the nares. No hylid is likely to be confused with *Platymantis*, but any doubt can be resolved by dissection, which will reveal the firmisternal pectoral girdle (arciferal in the Hylidae).

The following key includes only the species found in New Guinea proper and on immediately adjacent islands. Many additional species are found in the Admiralty Islands, Bismarck Archipelago, and on

Bougainville Island, which are more closely related to New Guinea politically than faunally.

1. Internarial distance distinctly less than distance from eye to naris ($E-N/In = 1.10$ or more) 2
Internarial distance equal to or greater than distance from eye to naris ($E-N/In = 1.00$ or less) 3
2. Toes with a basal web or almost half-webbed; middorsal area smooth, lacking short, longitudinal, skin folds *punctata*
Toes unwebbed or with only a trace of webbing; middorsal area with numerous short, longitudinal folds of skin *papuensis*
3. First finger longer than second; maximum snout-vent length, 40 mm.
..... *batantae*
First finger shorter than second; maximum snout-vent length, 27 mm.
..... *cheesmanae*

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